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PROVISIONAL SPECIFICATION.

Improvements in the Manufacture of Fermented Liquors.

I, JOSEPH SCHNEIBLE, of No. 128 Mott Street in the City, County and State of New York, United States of America, Manufacturer, do hereby declare the nature of this invention to be as follows:—

This invention relates to the manufacture of fermented liquors, such, for example, as ale, beer, cider, wine, *etc.*, and is herein described with especial reference to the manufacture of lager beer, although it is not restricted to the manufacture of that particular beverage. In the manufacture of lager beer, as usually carried on hitherto, the beer leaves the fermenting vat at a temperature of $2\frac{1}{2}^{\circ}$ R. to $3\frac{1}{2}^{\circ}$ R. and at that temperature is brought to the stock vats which stand in a cellar where the temperature is ordinarily about 1° R. Here the beer is allowed to stand, while the temperature slowly falls, those albumenoids which will coagulate at the temperature slowly separate and the suspended matter is precipitated, it usually requiring about six to ten weeks or longer to effect a satisfactory precipitation. It not infrequently happens that fermentation continues to progress in the stock vats, the extent of this continued fermentation varying more or less at different times, wherefore the degree of attenuation of the beer cannot be precisely determined or fixed in advance, which is an exceedingly important consideration especially when the beer is to be finished by the artificial introduction of carbon-dioxide. Moreover, it sometimes happens that the objectionable or undesirable albumenoids, that is to say, those albumenoids which should be coagulated and separated, are not completely coagulated in the time during which the beer is allowed to remain in the stock vats and do not separate as they should, with the result that the finished beer on being exposed to low temperature becomes slightly turbid, especially in the case of bottled beer. Having all of these difficulties in mind I have sought to improve the process of manufacturing beer, or other fermented liquors, such as ale, cider, wine, *etc.*, so far as concerns the treatment of the beer or other liquid subsequent to its introduction into the fermenting vats, to the end that a saving of time might be effected, a rapid coagulation and separation of objectionable albumenoids and a corresponding precipitation of other suspended matter and of the coagulated albumenoids be facilitated, an absolute cessation of fermentation be effected whenever the beer or other liquid in the fermenting vats has reached the desired degree of attenuation and the production of beer or other liquid of absolutely uniform standard of attenuation be assured, whereby the finished product, even when artificially carbonated, shall also be absolutely uniform as to attenuation.

In accordance with my invention the fermentation of the beer or other liquid in the fermenting vat is allowed to continue until the desired degree of attenuation is reached, the fermentation being kept in check in the fermenting vat by the use of

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attemperators in the usual manner; the beer is then drawn from the fermenting vat and is conducted to the stock vats in a cellar, where the temperature, in well regulated stock houses, is usually about 1° R., but in its passage from the fermenting vat to the stock vat the temperature of the beer is reduced to a point at least as low as the temperature of the cellar in which the stock vat stands, being preferably 5 reduced to a temperature of about 0° R., or lower, so that when it reaches a state of rest in the stock vat it shall have already a temperature at least as low as that of the atmosphere surrounding the stock vat.

As a consequence of the reduction of temperature herein referred to the fermentation is arrested before the beer or other liquid reaches a state of rest in the stock 10 vat, wherefore there can be no further fermentation in the stock vat and no further change in the attenuation of the beer or other liquid, whether it remains in the stock vat a short time or a long time. As a further consequence the objectionable albumenoids and other matter are practically coagulated when they reach a state of 15 rest in the stock vat and are in condition for immediate precipitation, which begins soon after the liquid comes to rest in the stock vat and progresses rapidly, other suspended matter being precipitated and facilitating the precipitation of the coagulated albumenoids. Finally, the precipitation is not interfered with by currents within the body of the liquid and therefore takes place much more rapidly and completely than in the ordinary process of manufacture, where beer is brought 20 down to the stock vat at a temperature of 2½° R. to 3½° R., which not only is not low enough to absolutely stop fermentation, but is higher than the temperature of the surrounding atmosphere, wherefore, by contact with the cooler atmosphere of the cellar, the beer is cooled at its surface more rapidly than elsewhere, and the cooler particles sink and are replaced by others continually, thereby establishing currents 25 within the body of the liquid which interfere with and retard the necessary precipitation. It is also to be observed that whatever gas is contained in the liquid is retained and held in absorption therein by reason of the low temperatures and the absence of any increase of temperature, and the body of the liquid is therefore not disturbed by rising bubbles of gas. 30

Practical use of my improvement in the manufacture of beer and ale has demonstrated that in from twenty-four to forty-eight hours from the time the beer enters the stock vat the precipitation has progressed to a greater degree of perfection than is usually attained in a period of two or more weeks under the old process of 35 manufacture, and furthermore, that no change in attenuation takes place, no matter how long the beer remains in the stock vat, thereby showing a complete cessation of fermentation and ensuring the possibility of securing a product of absolutely uniform attenuation. The beer treated by the improved process, provided no albumenoids are subsequently introduced, remains bright even if exposed after finishing to very low 40 temperatures, showing a complete separation in the stock vat of all matters which are separable by reduction in temperature, so that there remains nothing which can be separated thereafter. Although the improved process has been devised with especial reference to the finishing of beer by carbonating, nevertheless it will be found equally advantageous when beer is to be finished in the old way of kraeusening, it being 45 necessary only to use sugar krausen and thereby avoid the introduction of albumenoids. It should be observed with reference to the manufacture of cider and wines by the new process, that to obtain the best results the cider or wine should be treated in substantially the same manner as ale or beer, that is to say, it should be kept at a low temperature, in a stock vat or its equivalent, for a considerable time to permit the 50 desired coagulation and precipitation to take place.

Dated the 17th day of November 1896.

For the Applicant,

PHILIP M. JUSTICE,
London, Chartered Patent Agent.

Schneible's Improvements in the Manufacture of Fermented Liquors.

COMPLETE SPECIFICATION.

Improvements in the Manufacture of Fermented Liquors.

I, JOSEPH SCHNEIBLE, of No. 128 Mott Street, in the City, County and State of New York, United States of America, Manufacturer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

5 This Invention relates to the manufacture of fermented liquors, such for example, as ale, beer, cider, wine, *etc.*, and is herein described with especial reference to the manufacture of lager beer, although it is not restricted to the manufacture of that particular beverage. In the manufacture of lager
10 beer, as usually carried on hitherto, the beer leaves the fermenting vat at a temperature of $2\frac{1}{2}^{\circ}$ R. to $3\frac{1}{2}^{\circ}$ R., and at that temperature is brought to the stock vats which stand in a cellar where the temperature is ordinarily about 1° R. Here the beer is allowed to stand, while the temperature slowly falls, those albumenoids which will coagulate at the temperature slowly separate and the
15 suspended matter is precipitated, it usually requiring about six to ten weeks or longer to effect a satisfactory precipitation. It not infrequently happens that fermentation continues to progress in the stock vats, the extent of this continued fermentation varying more or less at different times, wherefore the degree of attenuation of the beer cannot be precisely determined or fixed in advance, which is an exceedingly important consideration especially when the beer is to be finished by the artificial introduction
20 of carbon-dioxide. Moreover, it sometimes happens that the objectionable or undesirable albumenoids, that is to say, those albumenoids which should be coagulated and separated, are not completely coagulated in the time during which the beer is allowed to remain in the stock vats and do not separate as they should, with the result that the finished beer on being exposed to low temperature becomes slightly
25 turbid, especially in the case of bottled beer. Having all of these difficulties in mind I have sought to improve the process of manufacturing beer, or other fermented liquors, such as ale, cider, wine, *etc.*, so far as concerns the treatment of the beer or other liquid subsequent to its introduction into the fermenting vats, to the end that a saving of time might be effected, a rapid coagulation and separation of objectionable
30 albumenoids and a corresponding precipitation of other suspended matter and of the coagulated albumenoids be facilitated, an absolute cessation of fermentation be effected whenever the beer or other liquid in the fermenting vats has reached the desired degree of attenuation and the production of beer or other liquid of absolutely uniform standard of attenuation be assured, whereby the finished product, even when
35 artificially carbonated, shall also be absolutely uniform as to attenuation.

In accordance with my invention the fermentation of the beer or other liquid in the fermenting vat is allowed to continue until the desired degree of attenuation is reached, the fermentation being kept in check in the fermenting vat by the use of
40 attemperators in the usual manner; the beer is then drawn from the fermenting vat and is conducted to the stock vats in a cellar, where the temperature in well regulated stock houses, is usually about 1° R., but in its passage from the fermenting vat to the stock vat the temperature of the beer is reduced to a point at least as low as the temperature of the cellar in which the stock vat stands, being preferably reduced to a temperature of about 0° R., or lower, so that when it reaches a state of rest in the
45 stock vat it shall have already a temperature at least as low as that of the atmosphere surrounding the stock vat.

As a consequence of the reduction of temperature herein referred to, the fermentation is arrested before the beer or other liquid reaches a state of rest in the stock vat, wherefore there can be no further fermentation in the stock vat and no
50 further change in the attenuation of the beer or other liquid, whether it remains in

Schneible's Improvements in the Manufacture of Fermented Liquors.

the stock vat a short time or a long time. As a further consequence the objectionable albumenoids and other matter are practically coagulated when they reach a state of rest in the stock vat and are in condition for immediate precipitation, which begins soon after the liquid comes to rest in the stock vat and progresses rapidly, other suspended matter being precipitated and facilitating the precipitation 5 of the coagulated albumenoids. Finally, the precipitation is not interfered with by currents within the body of the liquid and therefore takes place much more rapidly and completely than in the ordinary process of manufacture, where beer is brought down to the stock vat at a temperature of $2\frac{1}{2}^{\circ}$ R. to $3\frac{1}{2}^{\circ}$ R. which not only is not low enough to absolutely stop fermentation, but is higher than the tempera- 10 ture of the surrounding atmosphere, wherefore, by contact with the cooler atmosphere of the cellar, the beer is cooled at its surface more rapidly than elsewhere, and the cooler particles sink and are, replaced by others continually, thereby establishing currents within the body of the liquid which interfere with and retard the necessary precipitation. It is also to be observed that whatever gas is 15 contained in the liquid is retained and held in absorption therein by means of the low temperatures and the absence of any increase of temperature, and the body of the liquid is therefore not disturbed by rising bubbles of gas.

Practical use of my improvement in the manufacture of beer and ale has demonstrated that in from twenty-four to forty-eight hours from the time the beer 20 enters the stock vat the precipitation has progressed to a greater degree of perfection than is usually attained in a period of two or more weeks under the old process of manufacture, and furthermore, that no change in attenuation takes place, no matter how long the beer remains in the stock vat, thereby showing a complete cessation of fermentation and ensuring the possibility of securing a product of absolutely 25 uniform attenuation. The beer treated by the improved process, provided no albumenoids are subsequently introduced, remains bright even if exposed [after finishing to very low temperatures, showing a complete separation in the stock vat of all matters which are separable by reduction in temperature, so that there remains nothing which can be separated thereafter. Although the improved process 30 has been devised with especial reference to the finishing of beer by carbonating, nevertheless it will be found equally advantageous when beer is to be finished in the old way of krausening, it being necessary only to use sugar krausen and thereby avoid the introduction of albumenoids. It should be observed with reference to the manufacture of cider and wines by the new process, that to obtain the best results 35 the cider or wine should be treated in substantially the same manner as ale or beer, that is to say, it should be kept at a low temperature, in a stock vat or its equivalent, for a considerable time to permit the desired coagulation and precipitation to take place.

Having now particularly described and ascertained the nature of my said inven- 40 tion and in what manner the same is to be performed, I declare that what I claim is:—

The improvement in the manufacture of fermented liquors, which consists in continuing the fermentation in the fermenting vat until the desired degree of 45 attenuation has been reached, then withdrawing the liquor from the fermenting vat and conducting it to the stock vat, and reducing the temperature of the liquor in its passage from the fermenting vat to a state of rest in the stock vat to a temperature at least as low as the temperature of the atmosphere about the stock vat and sufficiently low to arrest fermentation, substantially as described.

Dated this 13th day of August 1897.

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PHILIP M. JUSTICE,
55 Chancery Lane, London, Chartered Patent Agent for Applicant.